Standard for Energy Efficiency
In New State Buildings

Adopted by the State Building Board July 11, 2001

Objective, Application, Exceptions

The objective of this Standard for Energy Efficiency in New State Buildings is to reduce the cost of operating buildings owned by the State of Utah by reducing the amount of energy consumed. This standard establishes the minimum level of energy efficiency for new state-owned buildings. Design firms are encouraged to strive for a higher level of energy efficiency, when possible within the constraints of the project budget. The director of DFCM may authorize a lower level of energy efficiency when this standard is not achievable due to the unique circumstances of a particular project or the constraints of the project budget.

Standard

All new state-owned buildings shall be designed to be at least 25% more energy efficient than the performance of a similar reference building that just meets the minimum requirements of the ASHRAE 90.1-1999 Energy Standard for Buildings Except Low-Rise Residential Buildings with the modifications described below.

Compliance Measurement

Compliance with the energy code and this standard shall be demonstrated through simulation modeling of both the baseline and the proposed building utilizing the DOE 2.x program. Performance will be measured by the Energy Cost Budget (ECB) method described in Section 11 of the ASHRAE Standard as modified by this standard to clarify the characteristics of the baseline model for the reference building. The ECB method compares the predicted annual energy cost of the proposed building with the predicted annual energy cost of a similar, baseline reference building designed to just meet the prescriptive and mandatory requirements of the Standard. Dividing the proposed energy cost budget (PR) by the baseline cost budget (BL) and subtracting the result from 1 will give the energy performance improvement:

___% energy performance improvement = 100(1-PR/BL)

The ECB method establishes several design parameters as performance neutral items. Performance neutral items are those characteristics of the proposed design that must be identically baselined into the reference building model. For some of these parameters that the design team cannot influence, such as plug loads or building occupancy, it is appropriate to keep them as performance neutral items. For other parameters that are affected by the design approach, the ECB method will be modified as described below to convert these parameters from performance neutral items to those requiring comparison between the proposed design and a prescriptive baseline model. This modification is made to reward energy efficiency measures that are otherwise not recognized by the ASHRAE Energy Cost Budget (ECB) method of determining energy performance.

Unless otherwise provided for by DFCM, the design team shall submit the following to demonstrate compliance with this standard.

1. With the schematic design submittal, submit the baseline reference building model along with a narrative description of the design strategies to be employed to meet the standard.
2. With the design development submittal, submit an updated baseline reference building model along with the model of the proposed design showing the calculation of the % energy performance improvement.
3. With the construction documents submittal, submit an updated baseline reference building model along with the model of the proposed design showing the calculation of the % energy performance improvement.

Modifications to the Energy Cost Budget Method (ECB)

For the purposes of this standard, the baseline cost budget for the reference building (termed "budget building" in the ECB method of ASHRAE 90.1-1999) shall be modified as follows.

1. In general, the ECB method assumes that the budget model and the proposed design model are premised on the building being fully fitted out as intended for its future designated uses. Shelled spaces that have no assigned space classification shall be treated as office space.

2. The budget building shall be rectangular, with a 2.5:1 aspect ratio. The long dimensions of the building shall face East and West. The budget building shall have the same conditioned floor area with the same number of stories as the proposed design. Each story of the budget building shall be of equal area.

3. The fenestration area for the budget building shall be 40% window to wall ratio and distributed proportionally per exposure.

4. The interior lighting power for the budget building shall be the allowed power level as determined by the prescriptive path. The lighting power for the proposed design model shall be the actual power level as designed, given the constraint identified in paragraph 1 above.

5. The fan system efficiency (BHP per cfm of supply air) for the budget building shall be the maximum limit allowed by ASHRAE 90.1-1999, given that the type of fan system is consistent between the budget building and the proposed building.

6. For proposed designs that employ chilled water systems, the budget building design pump power shall be:
   - 22 watts per gpm chilled water, and
   - 19 watts per gpm condenser water if the chiller is water-cooled.